



SPRING/SUMMER EDITION

MID SOUTH CHRONICLE

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THE MID SOUTH IS VULNERABLE TO TORNADOES

BY JIM BELLES, METEOROLOGIST-IN-CHARGE

The Mid-South is one of the deadliest locations in the country for weather. It's not a pleasant thought. Recently, a study came out showing the Mid-South in the "bull's-eye" for tornado deaths in United States (Please see graphic from Ashley, 2008). You may be asking – why is this so? After all, Tornado Alley is located over the Great Plains not the Mid-South.

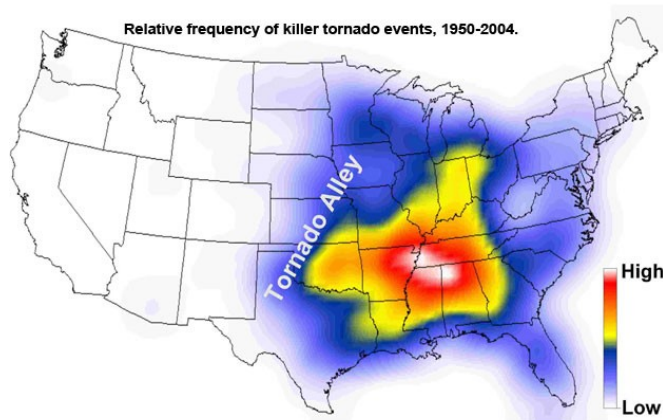
The answer is more complex than just the frequency of tornadoes. On February 5, 2008 a deadly outbreak of tornadoes hit the Southeast (known as the Super Tuesday Outbreak). Fifty-seven people died and many more were injured. In the wake of that disaster, a National Weather Service Assessment Team was commissioned to review both the performance of the agency and the societal impacts of why so many people died.

Although service assessments of this type are not unusual, they typically examine the internal procedures of the National Weather Service to ensure the agency is functioning at full potential. Over the years, much has been learned from these service assessments. Technological improvements, such as Doppler radar and a greater scientific understanding have been incorporated into opera-

tional weather forecasting. The result is significantly improved lead-times for severe weather warnings.

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Image courtesy of Walker Ashley, Northern Illinois University



AMATEUR RADIO...THE LINK TO COMMUNICATION IN TIMES OF NEED

BY COREY CHASKELSON, METEOROLOGIST

A disaster such as a flood, tornado, hurricane, or an earthquake has just occurred. Land based phones and cellular phones become inoperable due to a damaged or overloaded communication network. Amateur Radio operators, licensed by the Federal Communications Commission (FCC) step in to help out when normal lines of communication fail. They setup communication links in shelters and provide other vital communications which often is the only

communication link available.

These amateur radio operators in many cases are also Skywarn spotters. Across the mid south this group of people organized into a group of radio operators often provide the first "ground truth" reports of severe weather across the mid south. These timely and accurate severe weather reports are used in warnings and statements the National Weather Service issues.

Amateur radio operators are school teachers, scientists, businessman, students, and retirees. Many of the electronic conveniences such as cellular telephones were discovered by this group of people. If you're interested in learning more about the Skywarn spotter program and Amateur Radio visit the National Weather Service in Memphis on the internet at <http://weather.gov/memphis>.



WFO MEMPHIS HOSTS ALL HAZARDS DECISION SUPPORT WORKSHOP BY RICHARD OKULSKI, WARNING COORDINATION METEOROLOGIST

Our agency's service to decision makers is driven by relationships. Our relationships are built on trust, being a team player, understanding our partner's business, being able to provide information at the right time, and giving our best estimate and level of confidence.

The National Weather Service's office in Memphis, TN hosted a two day workshop February 3-4, 2009. Presenters included National Weather Service Southern Region Director Bill Proenza, Mississippi Emergency Management Agency Deputy Director Kent Buckley, and Madison County, Tennessee Deputy Director Chris Brazzell.

Other participants included meteorologists and hydrologists from Weather Forecast Offices from three Regions, emergency managers from

three states, fire departments and the U.S. Coast Guard. In addition, twenty WFOs and three Regions participated via a simulcast webinar.

Presenters raised the fact that relationships are cultivated long before high impact events through listening, following through on solutions to new requirements, and practicing in local and state exercises. Technology is an enhancer to these relationships. It is crucial that meteorologists and hydrologists communicate concisely in non technical terms, understand a customer's specific needs, adapt well to changeable working environments, and realize that weather is just information to a decision maker.

The presentations from this workshop can be accessed at the following website:

<http://www.srh.noaa.gov/meg/hazardsWorkshop/>

People in the first day of the webinar can access the recording at the following URL:

<https://www1.gotomeeting.com/register/701693389>



NATIONAL WEATHER SERVICE FORECASTS CRUCIAL DURING RUNWAY OUTAGE BY DOUG BOYETTE, MEMPHIS CWSU METEOROLOGIST-IN-CHARGE

Forecasters at the Memphis Forecast Office (WFO) and the Center Weather Service Unit (CWSU—located at the FAA Air Route Traffic Control Center in Memphis) are teaming up to provide critical forecasts in support of aviation customers at Memphis International Airport during an eight month planned outage of a primary runway.

The runway, 09-27, is the only east-west runway available. The other three runways are parallel north-south. 09-27 was closed for major repairs/resurfacing on March 2 and is not scheduled to reopen until November. Arrivals will be limited to using two of the three north-south runways, reducing the total per-hour aircraft capacity of the airport. During strong east or west crosswinds the

capacity could be lowered further.

This reduced capacity, when combined with routine delays or unnecessary diversions due to weather and other factors, can become a real drain on the bottom line of airlines and cargo haulers, especially during a down economy. However, part of this drain may be preventable, which is where the National Weather Service comes in.

Currently, meteorologists at the WFO and CWSU coordinate daily during the creation of the official aviation forecast for Memphis International airport, which is used for flight planning and fuel loads. During the outage CWSU forecasters will also be participating in a nightly re-

gional teleconference to advise stakeholders on possible adverse weather impacts. Memphis International is the busiest cargo airport in the world thanks to Federal Express (and a smaller UPS operation) with hundreds of airplanes arriving and departing every weeknight. Any fuel savings as a result of better weather forecasts not only help the customers but also the environment through less fuel burn.

Air safety remains job one though, and the runway outage will not affect the NWS's ongoing advisory role in helping the FAA operate the safest National Airspace System possible.



FEDEX FORUM BECOMES STORMREADY

BY ANTHONY CAVALLUCCI, SENIOR METEOROLOGIST

On January 16, 2009 the NWS in Memphis recognized the FedEx Forum as a Storm-Ready Supporter at center court before a Memphis Grizzlies game. Home to the NBA's Memphis Grizzlies and University of Memphis Tigers basketball team, the FedEx Forum is the state's first commercial site to achieve StormReady® supporter status. Shortly after the February 5th tornado outbreak in 2008 that affected the Memphis area, Anthony Cavallucci, Senior Forecaster and StormReady program leader in Memphis contacted Stephen Zito,

Vice President of Arena Operations at the FedEx Forum and discussed arena safety operations. Cavallucci asked to meet with Zito at the FedEx Forum to learn more about the facility and meet additional support staff. Zito and Michael Cerha, Senior Director of Operations were very receptive to doing whatever it took to ensure the safety of the patrons of the FedEx Forum. Discussion led to the tornado that struck the Georgia Dome during the 2008 SEC Men's Basketball Tournament.

Zito and Cerha had very good emergency operation plans



From left to right: Stephen Zito, Vice President of Arena Operations, Jim Belles, Meteorologist-in-Charge NWS Memphis, Anthony Cavallucci, Senior Forecaster NWS Memphis, and Michael Cerha

already in place. Cavallucci and Richard Okulski, WCM at Memphis, discussed the best locations within the facility to help protect the fans and asked them how

they acquire real time weather information.

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SEVERE WEATHER SAFETY TIPS

BY JIM BELLES, METEOROLOGIST-IN-CHARGE

Playing ball games, having a picnic in the park or perhaps a little fishing at the lake, it all sounds like the sights and sounds of summer. There is a downside to all the outdoor fun in the sun and that is severe weather! It can strike quickly and unfortunately it can be deadly. Fortunately, by understanding a few simple safety rules, lives can be saved. Even if you have been a veteran of many severe weather seasons, a yearly review is always important.

On average 100,000 thunderstorms occur across the United States each year, causing property loss in the hundreds of millions of dollars and killing and injuring hundreds. Hail alone produces millions of dollars damage to farms each year. However, one of the more lethal aspects of thunderstorms, lightning, is often one of the most ignored.

When lightning threatens, the best shelter is a building or home. Automobiles provide adequate shelter except in extreme winds and torna-

does. Natural lightning rods, such as trees, should always be avoided. Other danger spots include open fields, hilltops, rivers and lakes. Golfers should immediately discard their clubs. Stay away from metal objects like fences, rails and pipes. If you feel your hair stand on end, it means lightning is about to strike. Drop immediately to your knees and bend forward.

When a tornado strikes, the safest place is inside the basement of a home or building. Mobile homes are not considered reinforced shelter, so occupants should go to another structure or to the designated tornado shelter included at many mobile home parks. If a basement is not available, go to an interior room on the lowest floor. Stay away from windows. Cover your body with pillows or cushions. If you are driving or caught in an open area, do not try to outrun the tornado. Instead, head toward a ditch or culvert and cover your body for protection.

Flooding along rivers is a natural and inevitable part of life. However, torrential rains from thunderstorms can cause flash flooding in areas that are far from any river or stream. Saving property during floods is not the only thing we must keep in mind during floods. Personal safety is also a serious issue. In fact, more people die across the United States each year in flood-related weather disasters, then are killed by lightning and tornadoes combined! That is a sobering thought, especially since floods don't develop as quickly as tornadoes or strike as rapidly as lightning.

Fortunately, flood related fatalities can be avoided by taking several precautionary steps. First, never cross a flooded roadway in your car. Nearly half of all flood related deaths are auto related. Believe it or not, it only takes 2 feet of water to make your car buoyant; and 4-wheel drive vehicles are not immune. Sadly, many fatal incidents involve motorists who don't heed road clo-

sures, which can clearly mark the flood hazard. Remember, turn around and don't drown!

Throughout the season always keep handy a battery operated weather radio for the latest weather information. Weather Radio programmed by the National Weather Service, will provide 24-hour updates on river stages and severe weather information. Have a safe and enjoyable summer!



2008–2009 MID SOUTH WINTER SEASON REVIEW

BY CHRIS DUKE, METEOROLOGIST

Last winter caused quite a stir across the Mid-South as two very different winter storms plagued the area. On January 26-28th, a devastating ice storm impacted much of the Mid-South. Northeast Arkansas, the Missouri bootheel, and northwest Tennessee were the hardest hit areas. A deep layer of cold air allowed heavy sleet to fall across northeast Arkansas, followed by moderate to heavy freezing rain as the cold layer became more shallow. By the morning of Tuesday January 27th, more than

one quarter of an inch of ice had fallen north of a Jonesboro, AR to Paris, TN line with an additional inch or more of sleet across parts of Randolph and Clay counties in Arkansas. Precipitation changed over to light snow late Tuesday night as the system exited the Mid-South. Some snowfall reached as far south as the Memphis metropolitan area.

When the system finally cleared the area, over 2 inches of ice had accumulated in extreme northeast

Arkansas, the Missouri bootheel, and northwest Tennessee. These areas experienced nearly complete power loss. The power outages caused widespread difficulties due to the loss of heating and water. Temperatures also stayed below normal through Friday January 30th further compounding problems. Transportation

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NOAA "ALL HAZARDS" WEATHER RADIO FREQUENTLY ASKED QUESTIONS BY COREY CHASKELSON, METEOROLOGIST

Frequently Asked questions about NOAA Weather Radio and alerts

Dissemination of Severe Weather Warnings using NOAA Weather Radio...

Ever wondered how the Warnings are disseminated over NOAA Weather Radio? What are the strange sounds I'm hearing when a warning is being broadcast over NOAA Weather Radio? These are a couple of questions among several we receive about NOAA "All Hazards Weather Radio"

After a National Weather Service Meteorologist issues a Warning (such as a Tornado Warning, Severe Thunderstorm Warning, and Flash Flood Warning) these warning products travel from the AWIPS forecasting computer system over to the Console Replacement System (CRS). Once the warning product arrives on the CRS computer system, a text-to-speech program converts the text warning to an audio warning and sends the newly created audio product over to the appro-

priate NOAA Weather Radio transmitter. A warning is considered a critical component to the NWR broadcast and will interrupt any ongoing radio broadcast with a series of oscillating low pitched sounds called a Specific Area Message Encoding (SAME) Tone and a long 1050hz tone. The SAME tone contains the type of warning, the beginning and end of the warning, and counties affected included in the Warning. These SAME tones are also included in other State-ments and Advisories that require immediate attention by the NWR listener. So

what is the 1050hz tone used for? The 1050hz tone is an older method used to alert older weather radios that do not have the SAME technology available and were around during the older Emergency Broadcast System program. The NWS continues to use both types of alerting in conjunction with the Emergency Alert System (EAS) mandated by the Federal Communications Commission (FCC).

Automation of warnings for NWR using computers has significantly reduced the amount of time it takes for a warning to be disseminated over NOAA Weather Radio. Just 11 years ago many NWS offices were using an older Weather Radio broadcasting system that consisted of broadcasts using 8-track tapes and a Forecaster reading warnings live over the air as they were issued. If a problem develops with the CRS computer, a forecaster has the capability to send the warning out live with the appropriate alert tones and alarm without using the sophisticated computer system. The NWS Memphis NOAA Weather Radio program is available 24 hours a day, 7 days a week, 365 days a year to alert you when seconds count to protect lives and property.

When are the NWR weekly tests scheduled? Why didn't my radio alert during the Routine Weekly Test?

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NOAA Weather Radio Transmitters :

Memphis, TN 162.475 Mhz

Jackson , TN 162.55 Mhz

Jonesboro, AR 162.55 Mhz

Booneville, MS 162.40 Mhz

Oxford, MS 162.55 Mhz

Dyersburg, TN 162.50 Mhz

Wardell, MO 162.525 Mhz

Vale, TN 162.45 Mhz

Marvell 162.525 Mhz



WEATHER RADIO FAQ (CONTINUED FROM PAGE 4)

The National Weather Service in Memphis has a Routine Weekly Test to check the readiness of your weather radio every Wednesday, between 11 am and noon weather permitting. If the test must be cancelled we will try to hold the test the following day around the same time. Unfortunately, if weather continues to remain inclement, the weekly test is then postponed until the following Wednesday.

There are several things that can cause you not to receive alerts of our warnings or tests over NOAA Weather Radio. A radio signal from the NWR transmitter typically

travels around 40 miles. Beyond this distance, the broadcast can become difficult to hear and less reliable for warning reception. Here are a few tips to help you optimize the chances of hearing and being alerted by NWR:

*Place the radio in a location that is favorable for reception (obstacles such as metal buildings, trees, hills, concrete can degrade the radio reception)

*Choose the Weather Radio Frequency that provides you with the clearest reception (increases the chance of receiving the warning)

*Ensure you have programmed your radio with the appropriate county(ies) to be alerted for.

*If in a building, move your radio from room to room to find the best location

*And most importantly, make sure you have batteries with a good charge in the radio if not connected up to a wall outlet.

MID SOUTH VULNERABLE TO TORNADES (CONTINUED FROM PAGE 1)

Never the less, people are still perishing in tornadoes despite advanced notification.

The Super Tuesday service assessment is unique in that it is the first to key on the societal impacts which have provided insights into why some people take cover while others don't heed severe weather warnings. Based on public response, the assessment team found that two-thirds of the victims were in mobile homes. The majority of those interviewed for the assessment sought shelter, but 60 percent did not have access to safe shelter (a basement or storm cellar). Some indicated they thought the threat was minimal because February is not within traditional tornado season. Several of those interviewed said they spent time seeking confirmation and went to a safe location only after they saw a tornado. Many people

minimized the threat of personal risk in the belief that bad things only happen to other people.

As you can see, saving lives during a tornado outbreak is more complex than just delivering an advanced warning. People need to receive the warning, believe in the threat enough to take action, know what action to take, and then finally have a safe location to shelter. If interruptions along this process occur, a fatality or injury is possible. This is why the Mid-South Region faces tough challenges, to reduce tornado fatalities.

Ultimately, cultural change will need to occur. Storm Shelters need to become more common. The means of severe weather notification need to be more ubiquitous and redundant. Public education and preparedness must be ingrained. Otherwise, future scientific ad-

vancements will not be able to reach their full potential. Finally, reducing the vulnerability of tornado fatalities in the Mid-South is a mixture of applying sound atmospheric science with an understanding of society impacts.

Summer Heat Safety Tips:

- Wear light colored, loose fitting clothing
- Avoid extreme heat outdoors and stay out of the sun.
- Stay in an air-conditioned environment
- Eliminate strenuous activity
- Eat less foods that increase metabolic activity and water loss.

"Reducing the vulnerabilities of tornado fatalities requires applying both atmospheric science with society impacts"



Remnants of an SUV found on top of a tree in Arkansas –from 2008.

FEDEX FORUM STORMREADY (CONTINUED FROM PAGE 3)

Numerous suggestions were received with enthusiasm and quick remedies. "It's really nice to see that the management staff at the FedEx Forum makes safety their number one priority,"

said Cavallucci. Jim Belles, Meteorologist in Charge at Memphis, accompanied by Cavallucci presented Zito and Cerha

with a recognition letter and special StormReady signs.

WINTER SEASON 2008-2009 WRAP-UP (CONTINUED FROM PAGE 4)

problems were also evident due to fallen trees and power lines in addition to icy bridges and overpasses.

Another devastating winter storm struck the Mid-South February 28-March 1st. This time, it was heavy snow that plagued the entire area. A strong cold front pushed through the area on Friday February 27th establishing a deep layer of cold air area wide. As this front stalled over central Mississippi, an area of low pressure developed along the boundary and pushed northeast bringing ample moisture to the mid-south. Precipitation began falling in the form of sleet during the early afternoon

hours on Saturday February 28th. However, with a deep enough cold layer due to a deep upper low, the sleet quickly changed over to snow and continued through the evening and overnight hours tapering off early Monday morning March 1st.

By storm's end, numerous areas across west Tennessee and northeast Arkansas received over 12 inches of snow with a maximum of 18 inches measured in Oakland, TN. Lesser totals were seen in northern Mississippi where values ranged from 1 to 5 inches. Wind also played a major role with this event. Wind gusts of near 40 mph were experienced in north-

east Arkansas with wind chill values in the teens. Thunder was also heard in southwest Tennessee the midst of the heavy snow which speaks to the strength and dynamics of this event. In retrospect, it was an event that has only been experienced a handful of times across the midsouth in the last century.

As an area that is much more known for severe weather, the midsouth has had its share of severe winter storms over the years and this past winter season definitely caught the attention of mid-south residents.

" The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community. "

ARE YOU PREPARED FOR SEVERE WEATHER?

VISIT [WEATHER.GOV/NWR](http://weather.gov/nwr) TO FIND OUT MORE ABOUT NOAA WEATHER RADIO AND WHERE TO PURCHASE A RECEIVER FOR YOUR HOME, BUSINESS, COMMUNITY, OR ORGANIZATION.

UPCOMING WEATHER AWARENESS WEEK:

Lightning Safety Awareness
Week—June 21-27, 2009



Write to us at :
National Weather Service
7777 Walnut Grove Road, OM-1
Memphis, TN 28120

Visit us on the web at <http://www.weather.gov/memphis>